Britain

1891

51/16

Sheet, Metal & Wire.

51. GRINDING AND POLISHING,
Metal,
Sheet Metal and Wire.

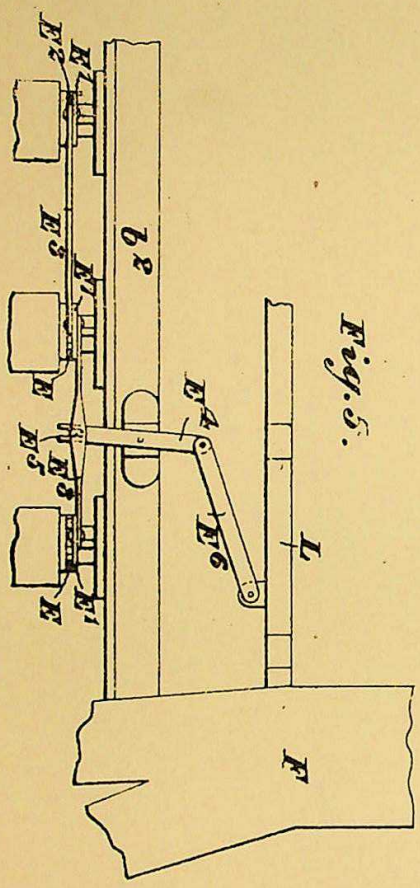

Fig. 3.

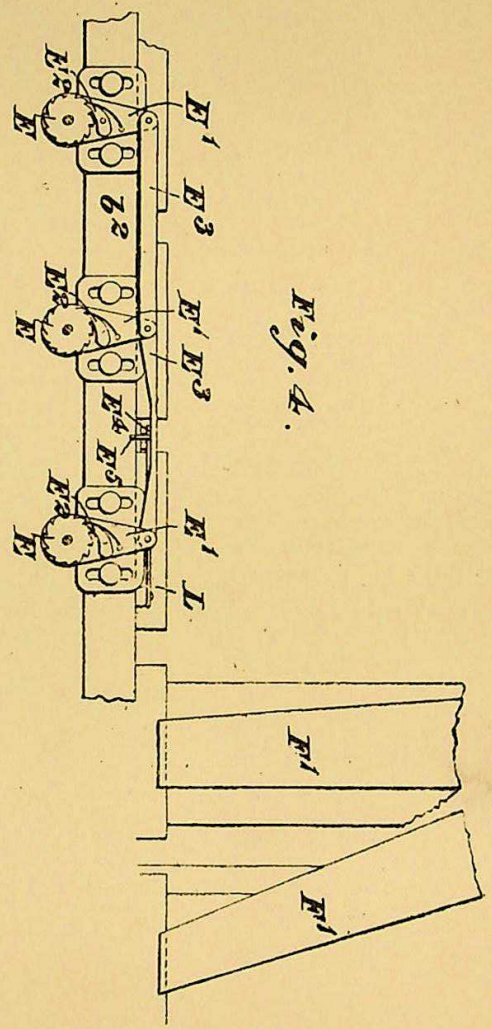

Fig. 4.

[This Drawing is a reproduction of the Original on a reduced scale.]

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Sheet Metal Work

N° 2276 A.D. 1891

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Complete Specification Left, 5th Dec., 1891—Accepted, 19th Dec., 1891

PROVISIONAL SPECIFICATION.

Improvements in Apparatus for Cleaning Metal Plates or Sheets.

We, PHILIP ROGERS, of 4 St. George's Terrace, Hanover Street, Swansea, Machinery Agent, and JOHN PLAYER, Tin Plate Manufacturer, of Clydach near Swansea, in the County of Glamorgan, do hereby declare the nature of this invention to be as follows :—

This invention relates to apparatus adapted to effectually remove grease and dust from metal plates or sheets, more especially tin and terne plates, without buckling scratching or otherwise damaging them. The apparatus is designed to work in connection with a tinning machine of the kind described in the Specification of a former Patent No. 15,040 dated November 1886 and in the Specification filed with an application for Patent No. 11,606 dated July 1890, but can also be adapted to clean plates that are coated by other means.

For this purpose we provide a tilting shelf on to which the coated plates are delivered one by one say by the pick-up device of a tinning machine. This shelf, which may be worked from the tinning machine deposits each plate flatwise on a carrier by which it is carried forward to a pair of rolls by which the plate is passed through a trough containing suitable cleaning material such as bran. This trough is divided horizontally into two parts and means are provided to impart a reciprocating motion thereto in a direction transverse to that in which the plate moves when passing through it, the two parts of the trough moving by preference in opposite directions. The plate can be passed through as many bran troughs in succession as may be found necessary to thoroughly scour off the grease and afterwards through one or more troughs somewhat similar to the bran troughs but fitted with material adapted to wipe off the dust such as sheepskin or other suitable rubbing substance of flat or block form, or as circular live rolls, or rubbers arranged on bands. Finally the plates are allowed to collect on a shelf ready to be carried to the assorting room.

The bran or other cleaning material that escapes from each trough during the cleaning operation falls into a receptacle from which it is returned to the troughs by any suitable means such as an elevator. The bran carried out of the troughs on the top surface of the plates is collected in the same receptacle, being swept off the plates as they pass under, or between a pair of brushes ; this arrangement can be applied to each bran trough used, and so prevent the bran from one trough mixing with that from another.

The rolls used for feeding the plates may be of metal or other suitable material, or be each formed of a series of discs of different materials and be clothed, or not, as may be found necessary or desirable.

The lower part of each bran receptacle may be provided with a series of openings to enable the bran to be gradually renewed if necessary. According to a modified construction the bran receptacle is divided vertically and the plates passed between the two parts in a vertical position. The two parts of the receptacle may in either case be moved together or in opposite directions, as may be desirable in practice.

The apparatus can be arranged to take the coated plates out of the present tinning machine rack, instead of replacing that rack by the tilting shelf afore mentioned.

By the construction described all the grease is removed from the plates by the novel action of the bran troughs, there being nothing to interfere with the scouring action of the bran on the plates. Perfect circulation of the bran is obtained

[*Price* 11*d.*]

and as very little resistance is offered to the passage of the plates by the bran in the trough, plates of fine gauge may be efficiently cleaned.

Dated this 7th day of February 1891.

P. ROGERS,
By L. W., per F. B.

J. PLAYER,
By L. W., per F. B.

COMPLETE SPECIFICATION.

Improvements in Apparatus for Cleaning Metal Plates or Sheets.

We, PHILIP ROGERS of 4 St. George's Terrace, Hanover Street, Swansea Machinery Agent, and JOHN PLAYER, Tin Plate Manufacturer, of Clydach near Swansea, in the County of Glamorgan, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement :—

This invention relates to apparatus adapted to effectually remove grease and dust from metal plates or sheets, more especially tin and terne plates, without buckling scratching or otherwise damaging them. The apparatus is designed to work in connection with tinning machines of the kind described in the Specifications of former Letters Patent granted to us *viz.* No. 15,040 dated November 1886 and No. 11,606 dated 24 July 1890, but it can also be used to clean plates that are coated by other means.

For this purpose the coated plates are delivered one by one, from a tinning machine to a pair of rolls by which the plate is passed through a trough containing suitable cleaning material such as bran, or saw dust mixed with a little lime. This trough is divided into two parts, and means are provided to impart a reciprocating motion thereto in a direction transverse to that in which the plate moves when passing through it, the two parts of the trough moving by preference in opposite directions. The plate can be passed through as many bran troughs in succession as may be found necessary to thoroughly scour off the grease, and afterwards or alternately through one or more devices somewhat similar to the bran troughs but fitted with material adapted to wipe off the dust such as sheep-skin or other suitable rubbing substance arranged in flat or block form, or as cylindrical rolls, or as rubbers arranged on bands. Finally the plates are allowed to collect on a shelf ready to be carried to the assorting room.

The bran or other cleaning material that escapes from each trough during the cleaning operation falls into a receptacle from which it is returned to the trough by any suitable means such as an elevator. The bran carried out of the troughs on the top surface of the plates is collected in the same receptacle being swept off the plates as they pass under, or between a pair of brushes ; this arrangement can be applied to each bran trough used, and so prevent the bran from one trough mixing with that from another.

The rolls used for feeding the plates may be of metal or other suitable material, or be each formed of a series of discs of different materials and be clothed if found desirable.

The lower part of each bran trough may be provided with a series of openings to enable the bran to be gradually renewed if necessary. The bran trough may be divided vertically and the plates passed between the two parts in a vertical position. The two parts of the trough may in either case be moved together or in opposite directions, as may be found desirable in practice.

The apparatus can be arranged to take the coated plates out of the present tinning machine rack, instead of replacing that rack by the tilting shelf herein-before mentioned.

By the construction described all the grease is removed from the plates by the

novel action of the bran troughs, there being nothing to interfere with the scouring action of the bran on the plates. Perfect circulation of the bran is obtained and as very little resistance is offered to the passage of the plates by the bran in the trough, plates of fine gauge may be efficiently cleaned.

Referring to the accompanying drawings,

Fig. 1 is a longitudinal section of an apparatus for cleaning metal plates or sheets according to this invention; Fig. 2 is a plan of the same, and Fig. 3 is an end elevation partly in section.

For the sake of simplifying the drawings some of the small parts of the apparatus are omitted in some of the views.

C to C^5 are pairs of feed rolls arranged to convey the plates from right to left in Fig. 1. Each roll is carried on a spindle which runs in bearings in the frames L L, and one roll of each pair is positively driven. The power is transmitted from the first motor shaft A by means of the bevel wheels a^6, the spur pinion and wheel a^7 and a^8 and the cross shaft a^9 carrying a pinion gearing with the spur wheel a^{10} mounted on a spindle and connected to a pinion a^*. Motion is transmitted from the latter pinion to the rollers through a train of spur gearing a^4. The bearings of the upper rolls are so arranged that they can rise and fall.

Between the frames L L, and parallel to them there are arranged two pairs of girders $b^2\,b^4$ and $b^3\,b^5$. The two girders $b^2\,b^3$ are connected together at the ends by tie rods and so are $b^4\,b^5$. They are supported by rollers $m\,m$ carried on the main frame, and can reciprocate on them to a limited extent. This reciprocating motion is derived from two pairs of eccentrics on the first motion shaft A. The eccentrics a and a^3 move the girders b^2, b^3, while the eccentrics a^1 and a^2 move the other pair. The bran troughs B and B^1; the dusters D, D^1, D^2 and the brushes c to c^4 are mounted on the girders and share in these reciprocating motions. By preference the pairs of girders move in opposite directions. Each bran trough is made in two parts horizontally, the upper part being connected to one set of girders, and the lower part to the other. The upper part is provided with cross bars b^1 and b to ensure a rubbing action of the bran on the top surface of the plates, and on the exit side with brushes n and n^1 placed at an angle, as shewn. These brushes extend the full length of the troughs and prevent too much bran being carried out on the top surface of the plates. There are brushes o and o^1 in the lower parts of the bran troughs. Three are shewn in each trough, but they may be replaced by one brush having several rows of bristles. These brushes are inclined at an angle as shewn, and have their ends slightly below the line of the path of the plates when passing between the feed rolls. They are designed to lead the front edges of the plates horizontally and to prevent them from burrowing into the bran.

In some cases one or more transverse brushes placed at an angle, may be arranged in the bottom of the upper part of each bran trough as shewn in dotted lines in Fig. 1 for the purpose of guiding between the two parts of the bran troughs plates having a set or camber such as would be liable without the use of the brushes mentioned to cause the plates to become blocked or entangled if fed into the machine with the set of the plates pointing upward. These additional brushes may be used in lieu of or in conjunction with the cross bars $b\,b^1$.

The dusters D D^1 and D^2 are arranged in pairs and are cylindrical. Their spindles are carried in brackets on the girders and are free to turn. To ensure that they shall rotate, and prevent the wool of the sheepskin with which they are by preference covered being worn into flats, a slow revolving or step by step motion is imparted to them, preferably by means of ratchet mechanism such as shewn in side elevation and plan in Figs. 4 and 5 respectively. In this mechanism a ratchet wheel E is secured to the spindle of each duster, and working free on each spindle is a lever E^1 provided with a spring pawl E^2 that engages with the corresponding ratchet wheel. The three levers E^1 are connected by rods E^3. E^4 is a lever pivoted to the girder b^2 and engaging at one end with a pin E^5 fixed to one of the rods E^3, and at the other end to one end of a lever E^6 the other end of which is

jointed to one of the frames L. With this arrangement as the girder b^2 reciprocates it will be seen that the levers E^1 will be oscillated and a step by step motion will be imparted to each of the upper dusters. A similar arrangement is provided for the bottom dusters but with the pawls arranged to rotate the ratchet wheels in the reverse direction. These ratchets are not shewn in the drawings. We prefer to arrange that the bottom dusters shall move in the same direction as the plates, and the top dusters in the opposite direction. The brushes c to c^4 move with the girders and sweep the bran from the surfaces of the feed rollers, thus keeping these rollers clean.

Beneath the bran trough is a hopper K through which falls all the bran escaping from the troughs. The bran is carried by a conveyor H, which may be an endless belt as shewn, or a worm, to an elevator (not shewn) arranged within a casing F and by which it is raised and distributed to one or other, or both of the bran troughs, according to the position of the valve F* shewn in dotted lines in Fig. 1 at the junction of the forked spouts F^1. The conveyor H is driven by belt from the pulley a^5, on the shaft A, to the pulley h on one of the conveyor shafts. The elevator is driven by a belt passing over the pulleys a^4 and f.

The table X receives the plates after passing through the machine, and is provided with an adjustable stop block x which can be fixed to suit different lengths of plates.

When the machine is to be used, bran is fed into the troughs until they are fairly full. Greasy plates are then fed into the first pair of rolls, and by them passed through the bran trough B, the feed rolls C^1, the bran trough B^1, the feed rolls C^2, the duster D, the feed rolls C^3, the duster D^1, the feed rolls C^4, the duster D^2, the feed rolls C^5, and are finally deposited on the table X.

The reciprocating motion of the bran troughs and dusters in opposite directions and transverse to the travel of the plates through the machine, while thoroughly cleaning the plates, offers such slight resistance to the passage of the plates that the finest gauges are operated on without damage, as there is nothing to interfere with the action of the bran on the plates all the grease is removed before it comes to the dusters, and the plates are finished free from scratches and buckles.

In some cases we provide openings for allowing the bran in the bottom part of troughs to leak out and so get renewed if required. We may use one or more bran troughs in succession followed by one or more pairs of dusters in succession with the necessary feeding rolls between as in the arrangement shewn, or we may arrange a bran trough and dusters followed by another bran trough and dusters and so on, with necessary feed rollers between.

When cleaning plates supplied from a tinning machine of the kind hereinbefore referred to, the plates may be automatically conveyed from the rack of the tinning machine to the cleaning apparatus by a conveyor. When desirable however we dispense with the rack and replace it with a tilting shelf which may be worked by the present rack chain and onto which the pick-up apparatus of the tinning machine places the plates one at a time. This tilting shelf tilts the plates over flatwise onto a conveyor leading to the cleaner, or the pick-up may drop the plates direct on to the conveyor.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed we declare that what we claim is :—

1. In apparatus for cleaning metal plates or sheets, passing the plate or sheet to be cleaned through a trough, or between troughs, containing cleaning material, such as bran, the said material having imparted to it at the same time a reciprocating motion relatively to the plate.

2. In apparatus for cleaning metal plates and sheets the combination of two troughs containing cleaning material placed face to face, and moving in the same or opposite directions, the arrangement being such that a plate can be passed

between the said two troughs and during its passage will be subject to the action of the material contained in the troughs substantially as herein described.

3. In apparatus for cleaning metal plates or sheets, a trough containing cleaning material, such as bran, through or over which a plate or sheet is passed and provided with a brush or brushes arranged to guide the plate or sheet and prevent it diverging from its proper path substantially as described.

4. In apparatus for cleaning metal plates or sheets, the combination with a trough or troughs containing cleaning material such as bran, of feed rollers to pass plates or sheets through or over the said material substantially as described.

5. In apparatus for cleaning metal plates or sheets, the combination with a trough or troughs containing cleaning material such as bran, through or over which the plates or sheets to be cleaned are passed, of a hopper to catch the material which escapes, and conveying and elevating devices to return the said material to the trough or troughs substantially as described.

6. In apparatus for cleaning metal plates or sheets, the combination with a trough or troughs containing cleaning material, such as bran, through or over which the plates to be cleaned are passed, of a duster or dusters formed of suitable material such as sheepskin with the wool attached, and arranged to move transversely with relation to the plates or sheets passing through the machine substantially as described.

7. The improved apparatus constructed, arranged, and operating, substantially as described with reference to the drawings annexed.

Dated this 5th day of December 1891.

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46, Lincoln's Inn Fields, London, W.C., Agent for the Applicants.

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